AMERICAN JOURNAL OF OPTOMETRY

VOL. 2. No. 10 OCTOBER, 1925

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AMERICAN JOURNAL OF OPTOMETRY

Vol. 2 OCTOBER, 1925 No. 10

WHAT IS VISION?

F. McFadden, Opt.D., F.A.A.O.

Athol, Mass.

Vision is defined as the sense of sight, while sight is described as the faculty of vision, or seeing. Verily we not only need new definitions, but also broader and far more comprehensive conceptions of the act of visual perception.

Man has a number of visual faculties in each of his eyes, when they are approximately normal. But man's sight differs very much from the sight which various species of birds possess. And the many forms of mammals have eyes which "see" in a far different manner from that of man, bird or reptile. In certain respects man's sight is something of an epitome of that of other seeing creatures; but on the other hand some of these faculties are rudimentary, having nearly vanished in his upward curve.

In some parts of creation there is sight which consists of a simple cell-like structure much like a minute blister upon the epidermis; and an "eye" of this type is merely sensitive to the presence of light, but it is a visual organ and represents "sight" nevertheless.

Our sight is a composite of many, many preceding types. Man not only senses light, but is capable of judging its intensity. His eye is capable of extreme adaptation of intensity ranging from the hundredth or thousandth of a candle-power upward to many thousand candle-power. Many of the lower forms of living things with which we are familiar are not so widely adapted, since some of them dwell in dark ocean depths, while others live in tropic glare, or where Man becomes speedily snow-blind.

Man is able to distinguish not alone the primary "colors" but even to discriminate between scores and hundreds of delicate hues. It is quite evident that some of the lower orders of life are color perceptive in a limited field of color, but not cognisant of color, possibly nor even of "light" when it is of some colors.

Man has acquired a faculty of very rapid light-adaptation from extremely low to very high illumination, and this adaptation is not entirely dependent upon the valve-like action of the iris, but is carried to a far higher plane by retinal sensibility. The mammals with whom we are familiar, and which can thus adapt themselves, have pupils which are capable of opening to almost the full width of their corneas, or of closing to a minute aperture. These movements serve their purposes perfectly but would be inadequate for Man.

There is a sensitiveness of the eye to motion, to objects which move, but when these objects are still the eyes fail to perceive, to take cognisance of the presence of such an object. This lack of perception by many of the hunted creatures is well known to huntsmen who take an unfair advantage in still-hunting, or in approaching so slowly as not to cause sufficient retinal stimulation to this faculty of **motion-perception** as to cause alarm. Often we hear it said that such game is myopic, but facts do not bear out the loose statement, for they do see well enough when roused to action.

An object which is still forms an image which is quiescent upon the retina, each retinal element having a constant stimulus, but if the object moves the image changes places upon these retinal elements and stimulates successive areas just as a fly crawling upon one's hand stimulates a series of nerve endings.

There is a sensitiveness to motion when the retinal picture merely moves **across** the field, giving rise to stimulation, for that stimulation is constant in intensity. But if the object is approaching its image becomes constantly larger, stimulating ever more and more nerve terminals in the retina, and

thereby serving as a warning signal. This sensation occurs whether the object approaches the organism, or the animal approaches the object. In either event the creature is appraised of **approach,** in distinction to a mere crossing of its field. In a similar way **recession** is sensed, by reverse stimulation.

The peripheral field of Man is particularly keen to the sensations of movement, while his more specialized field, the macular area, is not so keenly susceptible. The peripheral field may be considered rudimentary sight. It senses light, motion-to, motion-across, motion-from, and the colors.

Man has not the only eyes which are possessed of macular perception, since we find that the chicadee, the great horned owl, and other birds possess two macular areas in each eye, while the crow and certain other birds appear to have a linear macula. It would be easy for us to understand why two maculas in an eye, or a long macula would be an advantage to those birds, or even to animals, when their eyes are on opposite sides of their heads. Truly they have a far different manner of "sight" than Man possesses.

It is extremely improbable that such animals as the cow, horse, cat, and others having an oblong pupillary opening would be possessed of a macula as acute as that of Man. Primarily those animals have little or no need of such sharp definition as Man requires, but do have a need of a wide field and to be extremely receptive to movements of objects.

But Man's macula has become so highly adapted to his environment that it is by far the more important portion of his sight. The peripheral field might well be considered as performing the function of a funnel whereby any object-of-motion, or any object-of-direct-interest was automatically drawn into the vortex because the peripheral field of disturbance automatically draw the brain, the mind, or the visual faculty, to macular perception. The macular areas of the hindbrain are much more closely interwoven with other centers by association nerve fibres, than the peripheral retinal field is. This will be discussed in a future paper, however.

The macular area, and particularly the fovea, is sometimes said to be the only part of our eyes which is educated. This is not quite correct, for the peripheral field is of tremendous value in a very different way than the macular field. An amblyope is one whose macular field is undeveloped, but we shall find that such a person, if biamblyopic, will keep himself out of difficulties fully as well as will a person whose vision is normal.

When we measure the acuity of vision we merely estimate the resolving power of the macular field. It is entirely beside the mark to say that we have measured visual efficiency in estimating visual acuity. In fact it would be just as erroneous to weigh a man in order to determine his ability at work.

The mammal, the bird, the serpent and reptile, almost entirely, are possessed of binocular vision which is bilateral, but by no stretch of the imagination can be said to be binoptral. They undoubtedly have "single binocular vision" in its strictest sense, but the fields cannot possibly "blend." If ever the eyes do perceive simultaneously and transmit their impressions simultaneously to the two brains, both mental concepts cannot possibly rise to the surface of consciousness of the creature simultaneously. If they did, confusion would result. There is undoubtedly binocular vision with monoptral conception. Man has not entirely outgrown his grandparentage —for witness our own cases of "suspenopsia." Many times we have alternations of vision varying from fractions of a second to a minute or more. A slight disturbance in our visual sense, whether ocular or neural, will make us revert.

Those very familiar domestic animals, the dog and cat, have forward placement of eye sockets, but their versions are extremely small, in fact entirely inadequate to enable them to converge as much in proportion as Man does. There is not even yet a certainty that they have maculae, at least such as we own. And without maculae there would be neither desire nor ability to conform to our type of convergence. Moreover, without maculae and convergence there would be no common fixations, hence no manlike co-ordination.

Judgment of distance is a faculty dependent upon a number of specially developed faculties. There must be binocular vision, together with accurate co-ordination of the eyes. We judge the sizes of objects by comparative retinal magnitude and experience, but we judge their distance, sizes being known and understood, by a specialized sense of triangulation. The nearer to us a known object is, the more must the eyes turn inward to line upon it. The surveyor is able to measure the distance of an inaccessible object by laying off a base-line of known length, then setting up his instrument at each end of this line and measuring the angle it makes when pointing directly at the object. With the two angles and his base-line he either plots or calculates his distance in figures. We do the same a million times every day, for the centers of rotation of the eyeballs are a "known" distance apart, and the power required to angle the eyes upon the object gives the brain its necessary data for every estimate. Experience makes calculation instantaneous, and so accurate that one can thread a fine needle. Cover one eye and such estimates are quite difficult or wholly impossible.

It is because of this faculty that man has stereoscopic vision and it is highly unlikely that any other creatures than the primates possess it. Without binoptral vision there cannot possibly be stereoscopic vision. Without stereoscopic vision one cannot gauge distances with any degree of safety. If there is alternation of vision —which is a reversion to primitive vision—there cannot be continuous and safe stereoscopic vision. If suspended vision (suspenopsia) does occur in this way, even for very brief intervals, it robs a man of his distance judgment for that period of time. As a motor driver he is a menace every moment he is in command of the wheel. While he would pass our regulation tests, nevertheless there are so many necessary faculties of sight that a mere acuity test is in no sense a measurement of his visual efficiency.

A man may be amblyopic, in the sense that the fovea, macula, and macular area in the brain, have not developed normally; while at the same time his peripheral field is normally alert to motion, to motion-across, to motion-receding, and to motion-approaching, as well as to color perception, so that he would be quite normal. Some cases of this type do not have suspended vision. There may be but one missing or one partially developed faculty of sight, all others being up to the full requirements.

It has become a tradition with us to measure the "power of vision" solely by taking its acuity, or estimating the resolving power of an eye by its ability to distinguish letters of various sizes. This is a measure of V.A. but it is not a measure of visual efficiency, being merely **one** of the factors which enter into it. One or both eyes of any person may have a low acuity or resolving power, simply from the fact of an undeveloped form-sense of the corresponding area in the hind brain, but this person may be normal in all other visual faculties, and often times we find by suitable tests that their visual efficiency will rate well up toward normal. Resolving power (form-sense) may be injured by accident or disease without any material reduction to the other faculties of sight, but it is foolish to set down a measure of visual efficiency solely by a percentage estimate of visual acuity.

If we are to have a comprehensive knowledge of vision, or sight, it is evident that we should study far deeper into the subject than the mere human eyeball. We need to enter into the anatomy of our brain, into the anatomy of the eyes of all types of life, reptilian, mammalian, avian, and to study the faculties of those creatures with a view to understanding our own vision better.

Optometry doesn't consist merely of fitting lenses to defective eyes, but it embraces a wide study of every type of vision in man and all his predecessors.

THE OCULOMETER

J. W. Parker, Opt.D.
Kansas City, Mo.

The oculometer is primarily a stereoscope in which the lenses and prisms are separate units. The lenses are mounted in frames attached to, and actuated by a horizontal rod which is threaded right-hand at one end and left-hand at the other . Turning the rod in one direction separates the lenses and reversing the movement brings them closer together. We thus get a prismatic effect from the lenses for use in both testing and exercising. The prisms are mounted in square frames which slide in a groove in front of either eye-piece. Being square, they can be turned with base in any desired direction. A double prism is also mounted in same style frame.

The lenses can be run clear of the sight holes when it is desired to use prisms alone. A carrier for the various test and exercise cards is actuated by a rack and pinion movement which carries the cards toward or away from the eyes. This carrier is the correct size for the standard (Kroll) cards in common use for exercise and development of the fusion sense. The instrument is a convenient device for making such tests as the "Line and Arrow," the "Double Prism," etc.

When it is desired to use the instrument for testing or refraction, a four inch tube carrying a 10 D lens is placed before the eye under examination. The carrier is then equipped with a metal plate which carries a clock

dial, revolvable cross and test letters. The principal use is the same as in the Punctumeter and other instruments of similar nature. Only a hyperope can see clearly through a plus lens at a greater distance than the focal length of the lens. The zero point, therefore, is exactly four inches from the lens. A graduated scale is inlaid in the bed of the instrument and an indicator attached to the carrier gives the dioptric value of the distance between the lens and the test targets. The greatest distance at which the letters remain clear indicates the refractive error. If beyond the zero mark hyperopia is indicated. If between zero and the eye, Myopia.

OCULAR ORIENTATION

A Super-Faculty of the Eyes
PART II

A. W. Hazen, Opt. D.
San Francisco, Calif.

Tests and Method of Treatment

In our practice we speak of muscle exercises, of duction powers and of weak muscles. We say that we give prism exercises to develop weak muscles when as a matter of fact we do nothing of the kind. We say, if the adduction is low, that it is because the internal rectus is weak, but this is not the case—in most cases it is strong enough to function properly. Furthermore, the term "muscle exercise" is misleading. Prism treatments actually exercise a muscle but very little. I do not mean to say that the muscles are not developed some, but simply that their development in a physical way is not of prime importance. Quite naturally that in order to successfully treat muscular abnormalities, we must clearly understand the conditions which cause muscle action, in order to be able to diagnose just what is lacking.

Regarding the muscles of the eyes and their action, therefore, we must bear this important feature well in mind, that there are two principal sources of stimulation. The first is the stimulation which the mind exerts upon the muscles for action for the purpose of version. This stimulation and action is voluntary. Whether the muscles respond to this stimulation or not and the speed with which they respond depends upon the actual strength of the affected muscle. The second source of stimulation which affects the ocular muscles is that exerted through the stimulation of the fusion sense and is for the purpose of creating and maintaining binocular vision. This stimulation is involuntary and whether the muscles respond or not and the speed with which they do respond depends upon the fusional strength.

We all know that we rarely find a condition where it is impossible to direct the eyes in any given direction because of a lack of sufficient muscle strength. On the other hand we frequently find cases who have difficulty in creating and maintaining binocular vision without considerable fatigue after "fixing" a given object for some time.

Therefore we find that rotating the eyes or version is an act which rarely causes fatigue, while on the other hand binocular vision under the power of fusion frequently does cause fatigue. This is why I have previously stated that the fusional strength is what we wish to develop, rather than muscle strength.

Another very satisfactory way of stating this is to say that the co-ordination between the fusion faculty and the converging act requires development, for when we take a general view of the entire functioning of the eyes, we have nothing more or less than a marvelously intricate co-ordinating system of nerves and muscles all working to the end that we may enjoy comfortable, clear and single vision.

When we take the duction power of an eye and find it below normal it does not indicate a weak muscle, but it does indicate that the stimulation which the fusional faculty exerts on the basal nerve center is weak. Fortunately we not only can test accurately the fusional or duction power of an eye, but we can restore it to normal after an abnormal condition is found.

The first step after the refractive error has been determined is to make your phoria test. It is important, however, not to confuse phoria with duction. They are entirely different and have very little relation to one another. A phoria indicates tonicity or muscle tone, it simply shows the direction which the visual axis takes when the fusional faculty has been released. Great care must be exercised in properly interpreting phoria findings, as these findings do not indicate the only muscle which should be treated. To go further, there are many cases of esophoria which really require adduction treatments, because of a low neuricity reserve in the internal recti muscle nerve centers.

Also there are many cases on record of orthophoria with a very severe asthenopia, and in giving duction treatments for relief, there is often an artificial heterophoria developed, so an anatomical deviation or one of the phorias is a very misleading factor for determining normal or weak fixation nerve centers. The only valuable information the phoria test gives the refractionist is, for instance, if a patient has 5 degrees of exophoria and in measuring his adduction—say 30 degrees—he in reality has only an adduction of 25 degrees from the standpoint of a normal eye—or orthophoria—because he has the 5 degrees of exophoria to overcome first before he starts converging. As refractionists we should always make the phoria test, but we must not allow our findings to guide us in determining the weak nerve centers or we will often be fooled, as it only serves to show us what the eyes have to overcome to perform normally.

I have stated that low duction power is not caused from a weakened muscle, and therefore prism treatments are not for the purpose of building up muscle strength. If this is true we can easily see wherein the argument advanced for a rhythmic motion as induced by rotary prisms is in error, and is of no more value from the standpoint of muscle building than the finger, or wall to wall exercise, for they too cause a rhythmic contraction of the extrinsic and ciliary muscles. Besides this, in most cases the muscles are already matured and only require a building up of a reserve innervation and a more alert co-ordination. When I say that these prism treatments are not for the purpose of building muscle strength, I appreciate the fact that I am contradicting the generally accepted theory and practice, so I am placing myself in a position wherein I must disprove the existing generally accepted theory and prove my contrary statements. This I will endeavor to do. I will not simply make arbitrary statements and ask you to believe them, but I will rather build my case on a foundation of scientific facts, which can easily be proven. In fact they will be proven by already existing accepted facts. I claim no originality in these supporting facts, but I do claim some originality in the arrangement of putting together and the deductions taken from such an arrangement.

In closing my discussion on co-ordination, I stated that I would later refer to a statement then made to the effect that neuricity, or nervous impulses, were never sent to a muscle until the basal nerve center controlling that muscle was first stimulated, either by the mind power, over version through the conjugate centers, or by the fusion faculty. Now, let us formulate a sequence. The act of duction is an act brought about by the fusion faculty controlling the amount of nervous impulses going to the muscles affected. That is why I say that if prism is added base out before an eye and diplopia finally results, the diplopia was not caused from the fact that interni muscles were so weak they could not converge any further; but it was brought about because the fusional centers could not send a sufficient stimulus to the basal nerve center to release the necessary amount of neuricity needed to contract the interni and maintain binocular vision. So you see it is not a question of lack of energy going to the affected muscle so much, but rather a lack of stimulation on this basal nerve center to release a sufficient amount of its stored energy.

So if you will give a little thought to this point, you will appreciate the truth of this statement. **Duction is nothing more than the power of the fusion faculty to stimulate the release of energy for consumption by the ocular muscles.** From this you will see why I say prism treatments are not given to increase muscle strength, but are for the purpose of developing greater fusional power. It is upon a correct understanding of this fact that the success of prism treatments depends.

After recording the phoria, the next step is to take the duction power. This, as you already know, is done by placing prisms base out to test adduction; base in, for abduction, etc. The highest prism which does not produce diplopia being the duction power of the muscle under the Apex of the prism. Permit me to call your attention to a point here which is extremely important and one which will be discussed later in detail; that is the fact that there are two kinds of ductions, primary and secondary. Primary duction is recorded by the highest power of prism which, when increased gradually before an eye, can be fused. Secondary

duction is recorded by the highest power of a prism which, when it is placed suddenly before an eye, can be fused. This is a most important point which will be outlined in detail a little later on in this paper.

Now we come to the much discussed question of which is better for duction tests and duction treatments—the rotary prism or the instruments which cause the prism to come before the eyes in jumps or complete interval change of prism strength by degrees or fractions thereof.

In my opinion, the jump system is the scientifically correct one for nerve stimulation. The rotary prism is only efficient for anatomical diagnosis and primary duction exercises, but cannot be satisfactorily used for secondary fusion exercises, the most important part of fixation discipline. The quick acting impulses of a normal nerve center can only be developed by the jumping battery principle.

If you were developing or strengthening muscle fibre, the rhythmic action of the rotary prism that so many authors endorse would be a correct theory, but this is true only to a very slight degree. The muscle fibre is there, so what you are doing is building up a storehouse of nervous energy, to direct the actions of these muscles, and to enable them to perform their function with ease and comfort. It is exactly the same as an electric motor of any kind—no matter how large and strong it is, it will never run nor act until electric energy from the power house is distributed to it. Another evidence is in case of paralysis of any body muscle—the muscle fibre is there, just as big and strong as ever, but the innervation is lacking.

To grasp the significance of these two methods, it will be necessary to refer back to the point which I have already mentioned, viz., of two kinds of fusion or duction tests—primary and secondary duction. When we begin to test the duction power of an eye by means of a rotary prism we begin with a zero of prism power. Assuming there is no phoria present when the rotaries are at zero there will be no call upon the fusional centers, and consequently there will be no active innervation going to the muscles. Furthermore, the object light will be exactly centered on the fovea of each eye; now, as we begin turning the prism the fusion faculty stimulates the basal nerve center controlling the affected muscle and it transmits to that muscle sufficient energy to turn the eye toward the apex of the prism, thus maintaining binocular vision. Please bear in mind this important phase of the test, during the entire process of increasing the prism strength the image, or the object light, never moves from the macula of either eye until the limit has been reached and diplopia or double vision results. This is what I call the "primary duction power," and the area of fusional stimulation in this test is always on the macula. This area I call the "primary fusional area." Thus we have the following definition: **"The primary duction power is that power which the fusional faculty of the macula exerts on the basal nerve centers to maintain single vision when prism strength is applied gradually, the object light never being permitted to leave the fovea."** And second: **"The primary fusional area is the surface of the macula."**

Now suppose a prism of 5 degrees is placed suddenly before the eye, we know that a second image is immediately formed off to one side of the macula and we have double vision. The mind, as we know, abhors double vision, so the fusion centers of the area surrounding the macula are stimulated and if they can produce a sufficient stimulus on the basal nerve center, the affected muscle, under the apex of the prism, will contract and draw the eye to a position where this second image will fall on its macula and single vision will be brought about.

The highest degree prism in any one position which can at once be overcome is the measure of what I call secondary duction, and the area surrounding the macula I call the secondary fusional area.

Again we have the two following definitions:

"Secondary duction is that power which the fusion faculty of the area surrounding the macula exerts on the basal nerve centers to regain single vision, when prism strength is applied suddenly before the eye, the object light thereby being displaced from the fovea"; and

"The secondary fusional area is that area surrounding the macula and which is bounded by an imaginary line, inside of which the fusional sense is of

sufficient strength to bring about binocular vision when an image is displaced upon its surface."

This secondary fusional area can be definitely and quite accurately outlined. All that is necessary is to find the highest degree prism base out which, when it is placed suddenly before an eye, can be fused; this would give us the temporal limit of this field, the amount being called positive fusion. The degree of prism base in, in like manner is the measure of negative fusion, while the two combined gives us the amplitude of the fusional area and base down the lower. Now, if the limiting points can be connected by a line we will have outlined the secondary fusional area.

The existence of two fusional areas cannot be doubted and the further fact that the primary or macular area is the stronger is indisputable and can be easily proven. It is a well-known fact that an eye can be made to show a higher duction power when the test is made with a rotary prism, thereby retaining the image upon the macula for the duration of the test, than could possibly be attained if the same amount of prism were suddenly introduced.

With this knowledge in hand we may now turn to the original question, "which of the two methods is superior for treatment purposes,"—the rotary or jump system? The answer in all fairness must be that the jump system is better. While it is true that rotary prisms will increase duction power, their principal action is on the primary or macular area only, while the jump method develops both the primary and the secondary equally. Not only is the secondary fusion developed in responsiveness by the jump method, but the size of the area is also increased and in a way that would be practically impossible by means of rotary prism alone.

The importance of developing this secondary fusional area can not be over estimated, for it is upon this area that impressions of secondary vision fall. It comprises the most sensitive part of the retina outside of the macula itself, and it is upon this secondary vision which we depend so much for our bodily safety. Thus treatments which will develop the size and alertness of the secondary fusional area will at the same time develop the sensitiveness of this portion of the retina for the reception of secondary vision. If this were not true we could not increase our secondary fusional area for the reason that increased visual acuity always precedes an increased fusional stimulation. This being true, you can readily appreciate the advantages of the system which develops these two faculties simultaneously. It is needless for me to point out the benefits to be derived from thus increasing the alertness of secondary vision, for if you will imagine for a moment the part which it plays in crossing a busy street or in the driving of a motor car you can easily grasp the significance and value of this phase of the work.

Before leaving the subject of the secondary fusional area, there is quite an interesting point which I would like to bring out, and that is, that the stimulation for binocular vision diminishes as the limit of the secondary area is approached, or inversely, the nearer macula the greater is the stimulation for single vision. In cases of squint we know there is always a second image in the turning eye, although it is usually ignored. In correcting a case of this kind we do nothing more than increase the size of the secondary fusional area until the displaced image lies within its boundaries. When this area has been so extended that the displaced image falls upon its surface the affected muscle will be so stimulated that it will draw the eye into a position where its macula will receive the hitherto suppressed image and binocular vision will result. The same is true where prisms are prescribed for correcting strabismus. The prism does nothing more than bend the rays of light so that the image falls within the fusional area.

Of all the nerve centers involved, the most important is the third or motor oculi, and departure from the normal in this wonderful nerve system will almost invariably show up as a weak adduction under test, both primary and secondary, the secondary adduction especially. The standard of adduction is usually stated as 15 degrees to 25 degrees, and this standard has been made from observations made with rotary prism tests and are therefore primary. Usually where a first test of the primary duction shows even 25 degrees, the secondary will rarely be

over 15 degrees, and more often it will be about 12 degrees.

Here I wish to insert that a person engaged in near work with an adduction similar to the above, cannot possibly have really comfortable vision in spite of this arbitrary standard, and those people, up to at least forty-five years of age, who come to you for relief and show a condition like this, regardless of their refractive errors, are patients asking us for a real service and we will be derelict in our duty when we do not render that service, especially when results can be so quickly and simply achieved. I maintain that primary adduction should be at least 50 to 60 degrees and secondary 40 degrees to 50 degrees for the best results at near work.

As I have previously stated, treatments for building up adduction not only create more energy for stimulating the interni muscles, but also the ciliary, sphincter iris, levator palpebrae, inferior and superior recti and the inferior oblique muscles. That is why these treatments often restore to normal the so-called subnormal accommodation, and why eyes which have been extremely sensitive to light regain their ability to shut out excessive light through a proper contraction of the iris. It also explains why cases of ptosis or drooping of the upper lids have been entirely corrected. All this accomplished, mind you, through the intelligent application of proven principles. Naturally adduction treatment is by far the most common and necessary; but where the other basal centers are indicated, they will respond equally well.

The marvelous thing about this entire system of oculo-prism treatment lies in the fact that not only is the alertness of the fusional area increased and its size enlarged, but the nervous pathways are also developed in such a way that they can convey more neuricity with greater ease. What is still more important is the fact that the nerve center is developed in such a way that its capacity for storing neuricity is increased to a point where our daily tasks, even though our occupation may be such that we use our eyes a great deal on near work, seem relatively easy.

In reviewing literature on this subject I note that a number of qualified authors do not recommend exercises in case of adduction, sursumduction, and infraduction weakness and am positive that these refractionists must be users of the rotary prism method. I was the user of the rotary principle for a number of years and could never obtain satisfactory results, except occasionally, in adducting weakness, but since I have adopted the jump or battery principle some of the most gratifying results I have ever obtained have been with patients having a lack of energy in the vertical muscle nerve centers.

Patients with a weakness of the vertical muscle nerve centers are extreme asthenopic sufferers and do not respond as quickly and as easily as in cases of internal weakness; the nerve centers are easily susceptible to severe strain unless the prisms are manipulated with precision and low fraction degree intervals. In my experience it is useless to use other than the jump or battery principle in treating these forms of asthenopia.

To my mind, this work opens to refractionists one of the greatest fields of endeavor ever presented to us, and is fully of equal importance to refractive work itself. It is a work which justly belongs to us for the reason that it fits in so perfectly with our other duties, and it fills the need for handling many of these exasperating cases of asthenopia.

I cannot see how one can even be a successful refractionist without an accurate knowledge of this important function of comfortable vision because it is practically impossible to refract a case, even though the refraction is very accurate, to determine whether the patient is going to have an enduring comfortable vision, without the "orientation" or "fixation" function being considered. You cannot tell how much a horse is capable of pulling or doing by watching him stand still, and that is just what you are doing by refracting only and not measuring the capacity of eyes to function.

This paper is a plea—not for a less effort regarding refractive work, but for a greater effort and a more thorough investigation of this field of work. It is a most important part of our professional duties and if handled properly and scientifically will manifest most gratifying results.

PRACTIAL NOTES AND CURRENT REFRACTIVE TOPICS

R. M. Peckham, Opt. D., F.A.A.O.
Waterbury, Conn.

ILLUMINATION OF TEST CHARTS

The test chart in the average office is altogether too brightly lighted. While a strong illumination, up to a certain point, increases visual perception, the use of so strong a stimulus decreases the sensibility to slight changes in lens power. We can see, under the intense stimulus of strong illumination, about as well with a lens a quarter diopter too strong or too weak as we can with the exact correction. But with a weak lighting, a minimal stimulation, we cannot see so clearly with any but the lens that exactly corrects the refractive error.

To make the subjective test reliable, one essential is the control of the chart illumination. Reduce the illumination, and you will see the letters fade out, one by one. Those of the lower visibility, such as N, H, E, 8, 6, 9, etc., become unrecognizable at first. Now alter the lens power slightly, and as you approach accuracy of correction, those letters reappear one by one.

Subjective testing with letters presents many difficulties. There is always a doubt if the patient sees the letters or thinks he sees them. Reduction of illumination of the test chart will do away with much of this guess work. Especially is this true in the cylindrical corrections. Many a competent refractionist has failed to find any practical use for the one-eighth diopter steps. If such a one will experiment with weak illuminations, he will soon be convinced of the essential value of the eighth-diopter.

LIGHTING THE REFRACTING ROOM

How many offices will you find where any thought has been given to the arrangement and control of the lighting system. Lights are dangled from the ceiling, or placed against the walls, wherever there happens to be a convenient outlet. No attention is given to their efficiency in that particular spot, and as to the question of glare, of that the average refractionist never seems to even dream.

Lights must not be so placed that any beams from them can strike the examinee's eyes. For this causes the pupil to contract. This contraction increases the "depth of focus" of the refracting system, does away with aberration, thus reducing the reliability of the subjective test. An error of a half-diopter is easily made under such conditions.

Light at the side of the patient will have the same stimulating effect as a brilliantly lighted test chart. Vision is increased, but subjectiveness to fine distinction is lost. You can prove this by putting a blinder over one eye, directing the attention of the other eye to a weakly illuminated chart. Now hold the retinoscope light close to the sclera of the covered eye, and the chart appears brighter to the other eye.

The ideal illumination is the totally indirect. The fixture is hung from the ceiling, which should be painted (not kalsomined) with a high-grade, smooth surface enamel. The reflectors spread the light against this highly reflecting surface, which throws it back in evenly distributed light all over the room. There are no bright spots, no shadows, no reflections, no glare. Ophthalmoscopic and retinoscopic examinations are made in such a light without trouble. There is no necessity for darkening the room.

THE TRUE VALUE OF CLOSE CORRECTIONS

While the addition or subtraction of 0.12 D. may make no perceptible difference in monocular vision, many times it does make a tremendous difference in binocular vision. And it is

ease of binocular vision that is the point toward which the competent optometrist works. The balance between convergence and accommodation is, in many people, a very delicate adjustment. It takes very little to throw them out of poise. The use of the cross-cylinder test binocularly will demonstrate that many times even the eighth-diopter steps are too coarse gradations in fine optometric work.

And that brings up the question of accurate lens surfacing and accurate adjustments. If the lenses of the finished glasses are not at the same distance from the eyes as were the trial frame lenses, their effective refractive power is changed. We all know that, but seldom do we put many things that we know well into every day practical use.

There is no use in being lazy or negligent in the practice of optometry. Still, many a thoroughly good refractionist annuls the value of his fine work by failing to finish his job with the same meticulous care with which he commences it. There is no sense in spending the better part of an hour in working out a beautifully correct prescription, and then shooting the accuracy all to pieces by carelessness in the final fitting.

The new lens power is the vertex, or effective, diopter. That means the power of the lens in connection with the dioptric system of the eye. The old lens notation was the neutralizing diopter, the front focal power of the lens, which had no relation whatever to the power the lens would have when in front of the eye. Very few shops are equipped to surface the curves according to the specifications of the vertex diopter. Very few opticians know anything about optics. The lens products of the leading manufacturers are surfaced to the vertex diopter. The lens made by the average small shop is made on the old method tools, and if the lens neutralizes it is thought satisfactory. Therefore, if your prescription house isn't one of the few that are up-to-date, you'd better change, or rely entirely on factory-made lenses. Especially do we have trouble in getting accurate kryptoks and ultex bifocals. Insist on lenses that have been checked in vertometer or lensometer. If your jobber won't do this, change jobbers. A little forcible persuasion of this kind will soon bring the laggards up to date.

OPTOMETRY: OPTOMETRIST

Our men are constantly complaining about these two words. They say the public don't know what they mean. After being in use for nearly a quarter century, they are still comparatively unknown.

Whose fault is it?

Pick up the telephone directory of any large city and look through the classified business directory. Look under the headings "Opticians" and "Optometrists." The former will outnumber the latter, two to one, three to one, sometimes even the famous ratio of 1896, "16 to 1," is the proportion.

In the eastern cities it was the custom for years for most men to register themselves twice in the classified directory, appearing under the title "Opticians" and again as "Optometrists." Some of the telephone companies grew tired of thus advertising a man twice for one fee, and have lately taken to listing them together, "Opticians and Optometrists." And that makes a bad matter worse. For a true blue optometrist hates like the very deuce to be grouped in with the dispensing opticians, the only real enemy his profession has.

Go down the street and see how many signs "Optometrist" you can find. Not many. And on most of those few signs you'll see the killing word "Optician" in conjunction.

And those very men who use the words "Optometrist-Optician" on their windows and on their stationery are the ones who talk loudest about educating the public to distinguish between the optometrist and the optician.

Men prominent in the official life of the national optometric association, men on the state boards of examiners, men who are officers and hard workers in their state optometric societies, persist in using the word "Optician" on their signs. In every way they announce themselves to the public as opticians, then complain because that public can't distinguish between the trade of the optician and the profession of the optometrist.

The public know the name "optometrist" better than we think they do. The man who uses that one word on his window gets just as many transients as does the fellow who placards his place with all the freak words he can think of. The average man may not be able to pronounce the word fluently, but when he sees that word "Optometrist" he knows that's the place to get his spex fixed.

Like the Englishman who was asked if he knew Scotch, and replied, "I cannot speak it, but I can drink it," the man on the street may stutter over the word, but he knows what it's for.

Whose is the fault that the public doesn't know the word "optometry" better? That's easy to answer; 'tis the optometrist who calls himself "optician." If you want the word to become known, USE IT.

SPECIAL REPORT

ADVANCED EDUCATIONAL REQUIREMENTS

Ernest Petry, Dean
Rochester School of Optometry
Rochester, New York

Ever since the first intimation of a proposal to amend the Optometry law of the State of New York to require a four-year University course, there have been many disparaging criticisms advanced against it with a doom-prognosticating warning. The time element seemed to play an important part in the minds of all who wrote or spoke against the advisability of so advancing the educational requirements. Other professions, in their minds would be chosen by the prospective students because it would take only a little longer to prepare for these than Optometry would require if the proposed amendment became a reality.

The idealistic group who proposed these educational advancements, however, remained undaunted in their faith that the more thorough the educational structure of Optometry, the more enduring would the success of the profession be. Furthermore, since the chief criticism against the profession of Optometry in its developmental periods was that the average educational qualifications of its practitioners were too low, there was good reason to heed the suggestion thus implied.

Whether we as a profession have entirely satisfied this contention by amending many of our Optometry laws to stipulate a compulsory attendance of 2,000 hours in a recognized Optometry school is very questionable, since hours of attendance do not constitute accomplishment, nor will such a stipulation ever compel the cultural training which must be included in all professional training to meet the universally accepted concept of the qualifications of a professional man or woman.

This concept of the required qualifications of a professional man or woman has not been developed over night, but through years and years of comparative analysis, not on the part of a few individuals nor of any special groups, but on the part of all groups, classes and clans. In this manner, a sort of evolutionary compulsion has been built up which demands that all who would attain the distinction of being accepted as eligible to professional rating must not only have a thorough and specialized education in the field of endeavor to which they seek admission; they must not only have a humanitarian attitude toward the service for which they offer to enlist, but they must have a cultural training which adds to their make-up that embellishment of personality, poise, power of will and domination which typifies them as deserving of a professional classification.

A University training, especially that which leads to the Bachelor Degree, is in general accepted as comprising a suitable groundwork for the development of the requisite characteristics of a professional man. This being

so, for it is impossible to refute it with the extraordinary attendance in Universities all over the world as a proof thereof, how can the profession of Optometry dare hope that it is possible to evade these requirements?

True it is that many individuals in the profession through their energetic efforts to comply with these requirements are accepted as eligible for professional rating, but individual rating is too contrasting to be a safe procedure for Optometry.

It is Optometric standards, Optometric qualifications and Optometric service which deserve recognition and to these ends must we map our route. We must acknowledge the fact that a successful achievement of this task depends to a considerable degree upon how rigidly we conform to the general directions indicated by public opinion.

That time is a consideration in the minds of the prospective Optometry student may to a degree be true, but we doubt whether the few who do or must consider time as a factor in their choice of an education are of sufficient number to warrant handicapping Optometry's future. On the other hand, there are many thousands of high school graduates who enroll each year for a four-year college course for the one and only purpose of obtaining a cultural training. Without definite intent, these men and women have the desire to meet the one important requirement for professional recognition which Optometry Schools generally have not been able to provide.

If these same high school graduates who enter college each year for the purpose of earning their bachelor degree had their attention called to the fact that the University of Rochester in 1926 will offer an Optometry course which will not only prepare them for a profession but which will at the same time provide the same cultural educational possibilities as do the general arts and science courses, it seems logical that many will avail themselves of the opportunity to be doubly benefited by combining their cultural efforts with the preparation for a clean and promising profession.

Therefore, the four-year Optometry course will offer an opportunity to that class of students, whose first thought for higher education was along cultural lines, to save time since at the completion thereof they will not only be rated in the bachelor degree class but at the same time they will find themselves definitely prepared to launch out on a professional career.

It is true that a few prospects, because of financial limitations, will be barred and although it is to be regretted that a number of good prospects may be deprived of preparing themselves for the profession of Optometry, yet the future of our profession must always be given first consideration so that the profession and not the individual will be accepted as meeting all requirements of public opinion.

Furthermore, with the possibilities of persuading many young men and women who are now registering for bachelor degree courses, to enroll for the four-year Optometry course, the few who will be deprived because of finances, to do so, will be greatly offset.

Our obligation is clear and the course is laid. With a determination to weather whatever breakers there may be ahead, the good ship Optometry should have no difficulty in sailing its course to the glorification of its founders and gratification of all who are in need of its services.

REFRACTIVE COUNSEL

Dr. R. M. Peckham, Optometrist, of 111 Bank Street, Waterbury, Conn., will answer in these columns questions regarding difficult refractive cases. Our readers are requested to send him full particulars of each case, which will be published along with the reader's initials only. These questions and answers will appear monthly. Also in this department Dr. Peckham would like to receive the accounts of unusual cases which have been satisfactorily handled, which will be published, if accepted, over the practitioner's name.

Question: A boy of 16; correction: R. E., —8.50 Sph. () +0.50 Cyl. Ax. 180; L. E., —4.75 Sph. () +0.25 Cyl. Ax. 90; vision in each eye, 20/XXX. Perfectly comfortable at distance, but complains that glasses hurt his eyes when he reads, and says he can read better without them. Why is this, and what can be done to give him comfort in reading? (A. D. T.)

Discussion: The question was referred to Dr. Oscar L. McCulloch, Holyoke, Mass., who presents the following two causes for trouble and the preventive for each.

1. We will assume that the correction is absolutely the best that can be found, both for distance and near. The patient states that he is comfortable for distance vision, but that near work is where his trouble begins. This fact gives us a clue to the real cause of the trouble.

Here is the crux of the matter: In using the eyes for near vision, the eyes converge and also turn down. They use a different portion of the lens for reading than they do for distant vision. If there is any great inequality of power in the 90th meridian of the lenses, there is set up a condition that is conducive to vertical diplopia. To use this case as an example, in reading the eyes turn down approximately 10 mm. Apply Prentice's rule for finding the amount of prism in lens, "Prism power = Power of lens expressed in diopters multiplied by the decentration expressed in centimeters. In the 90th meridian of the right lens, the power is —8.50 — (+0.50) = —8.00. We get prism power —8.00 x 1.0 (cm.) = 8 D. base down. In the left eye, we get —4.75 x 1.0 = 4.75 D. base down. Of course, this is the effect of these lenses before the eyes, and the base of the prism in each lens is down, but being unequal in power, it creates the effect of a prism 3.25 D. (8.00 D. —4.75 D. = 3.25 D.) base down over the right eye only. Naturally, this causes trouble, because you never countenance the placing of so powerful a prism before a pair of eyes that have no vertical imbalance.

Now for the remedy. You can accomplish the desired result by cementing a plano prism segment 3.25 D. base up on the right lens, or 3.25 D. base down on the left, or split the strength between the two. It can be made also in Ultex. The segment should not be over 22 mm. in diameter and set not more than 1 mm. below the distance center.

Another way would be to make a pair of glasses exactly the same as the distance ones, with this exception: Grind the left lens as usual, that is, so that its optical and geometric centers coincide, but decenter the right lens down 4 mm., which will produce as per Prentice's rule a 3.25 D. base up. (3.25 x 10 mm.) ÷ 8 = 32.5 ÷ 8 = 4 + mm. This procedure will equalize the prism content of the lenses at the reading zone. But this will produce about the same effect at distance as the previous not decentered lenses did at the near point.

2. Please excuse me, if I seem to step on any one's dignity by picking flaws in their work, for I do not believe in criticising, unless it can be made constructive and helpful. From the evidence given, I imagine that these glasses are incorrect for near use. I find that **almost all myopes need bifocals, regardless of age.**

If you will place before the distance correction the following Cross-Cylinders, —0.50 Sph. () + 1.00 Cyl. Ax. 180, over each eye, and have the patient look at a near test card on which you have drawn several vertical and horizontal lines, you will probably find that he reports that the horizontal lines are clearer and blacker. Have him hold card at usual reading distance, about 14 inches, and add plus spheres until the horizontal and vertical lines are of equal color. I think you will find it will take from + 2.00 to +2.50 Sph. to do this. Check each eye separately and the two eyes together.

Make this correction up in bifocals, that is, R. E., —8.50 Sph. () + 0.50 Cyl. Ax. 180; L. E., —4.75 () +0.25 Cyl. Ax. 90; Add O. U. + 2.00 or whatever the additions are.

Use B Ultex with prism 3.25 D. base down in left segment only. Or, cement bifocals with the same size segments as Ultex B.

You will probably ask why a boy of 16 needs bifocals. Simply this: When you correct the distant vision, you upset his habit of Convergence and Accommodation at near, thus creating an Accommodative Esophoria. The best way to balance his efforts at the near point is by the addition of plus power.

Another point is this, if you have an Accommodative Esophoria at near point, if the patient is a myope, and you do not correct it by added plus power, you are in for a battle. Because you will find your myopia will increase. By using the bifocals you can ease this situation and later on reduce the minus distance lenses to the power of the reading correction, using prism base in to help balance your convergence-accommodative effort, and at the same time maintain binocular single vision.

O. L. McCULLOCH.

Nothing can be added to this, save the warning that in myopia the reading correction is far more important than the distance. True, the myope complains of needing distance glasses, and can read, usually, with no glasses at all. The old rule, give the myope the weakest possible minus lenses, was based on experience. Refractionists had found that the use of strong minus lenses had a tendency to increase the amount of the myopia, to bring on Progressive Myopia. Today we know that it is the use of these strong minus lenses at the reading point that is the cause of the trouble. Establish the reading correction first, then add the minus to give necessary distance vision, and prescribe bifocals. Don't let the myope get away with two pairs of glasses, for the reading pair will never be used. Give bifocals, whether it is a child of three or thirteen, a youth of sixteen or twenty-six. Age is no criterion as to the necessity of bifocals or any other form of lens.

R. M. PECKHAM.

ABSTRACT DEPARTMENT

Optometric and ophthalmic journal articles and reprints to be abstracted should be sent to Dr. G. L. DuPlessis. Only papers on subjests of interest to optometrists will be reviewed in this department.

Acute Retrobulbar Neuritis Affecting the Optic Chiasma and Tract. Traquair, H. M. British Journal of Ophthalmology; September, 1925.

Traquair describes acute retrobulbar neuritis as a form of an otherwise common disease, deserving more attention due to its diagnostic value.

The symptoms of the disease, which is prevalent in women, are headaches, central scotomata and hemianopic defects which change in location during the course of the affection. The peripheral changes are slight and bilious attacks are often complained of. The prognosis is good, but recurrence of other forms of nervous disease should be guarded against.

The article is profusely illustrated with charts giving the fields of the cases described; these fields were taken at different times and illustrate the changes in location of the scotomata.

G. L. DuP.

Headaches. Farrell, G. C. The Optometric Weekly; Vol. XVI, No. 26, 1925.

Farrell relates the symptomatic value of headaches in optometric practice, with special emphasis on Ewing's point. This is the point of attachment of the superior oblique muscle.

In a frontal sinus infection, the pain occasioned by the closure of the sinus is intensified by the tugging of the superior muscle during the process of accommodation. This pain can be partially relieved by lenses, but as the initial cause is still present the relief is not complete, and unless the patient has been forewarned the poor results obtained will reflect on the optometrist's skill.

The author presents two typical cases of headaches, and closes by urging the optometrist in doubt to consult his confreres.

G. L. DuP.

Notes on the Genesis of Myopia. Levinsohn, G. Archives of Ophthalmology, September, 1925.

Levinshon claims that the bending forward of the head and the body along with accommodation are the causes of myopia; he discusses the mechanical process involved. The author artificially produced myopia in animals by bringing the sagittal axis in the vertical position. This myopia was produced in a few months and was accompanied by ophthalmoscopic changes similar to those in humans G. L. DuP.

The Percentage Evaluation of Macular Vision. Snell, A. C., and Sterling, S. Archives of Ophthalmology, September, 1925.

Snell and Sterling in their paper deal only with macular visual perception. They bring out the point that the Snellen visual acuity notation is merely a comparative expression and not a fraction, and as such is not reducible nor convertible into a percentage form. A brief outline of the various attempts of percentage evaluation of vision is next given, and the measure of the efficiency or usefulness of its normal physiological function is determined as the correct basis for evaluating macular vision.

If artificial eye lesions could be produced experimentally, it would be possible to determine the effect of such lesion on the visual acuity, and thus secure comparative information of the resultant losses.

Obscurants simulating corneal opacities of various densities were made by etching fine lines crossing at different angles on glass. It was found that by superimposing glasses that would each reduce vision from 20/20 to 20/40, a proportionate reduction was secured. Six of these obscurants reduced the acuity to qualitative sight. From the above experiments, it was determined that: As the visual angle increases in arithmetical ratio, the visual efficiency diminishes in a geometrical ratio.

If 20/20 is then taken as 100% vision and qualitative vision as produced by six obscurants is 100% loss, or practically so, each obscurant therefore reduces vision one-sixth or about 16%, or 20/40 of the Snellen notation.

The loss for 20/100 is therefore 51% and 80% for 20/200, etc.

Note—The Snellen-Sterling tables were given in an original article in the June issue of this magazine.

G. L. DuP.

The Pupil. Zoethout, W. D. The Optometric Weekly; Vol. XVI, Nos. 16, 18, 21.

Zoethout, in a serial article appearing in four issues of the Weekly, describes the mechanism of pupillary reflexes. He groups the pupillary changes under five divisions as follows:

1. Reflex changes, through the stimulation of the sensory nerves by light. 2. Psychic changes due to mental states such as fright, etc. 3. Changes due to the associated movements of accommodation and convergence. 4. Changes due to chemicals, mydriatics and myotics. 5. Mechanical changes, caused by the influence of the systole and diastole on the blood vessels of the eye. G. L. DuP.

Psychology in Daily Practice. Parker, J. W. The Optical Journal and Review. Vol. LVI; No. 2.

Parker advocates the intelligent use of psychology in optometric practice, not as a screen to cover the optometrist's shortcomings, but as a means of impressing the patient with the practitioner's skill. "To make use of it as an aid to real skill and knowledge is both permissible and advisable. To attempt to substitute it for skill is both dishonest and foolish." G. L. DuP.

THE AMERICAN JOURNAL OF OPTOMETRY

Vol. 2 OCTOBER, 1925 No. 10

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Published monthly as the organ of the Iowa, Minnesota, Nebraska, North Dakota and Oklahoma Optometric Associations

Original papers, scientific communications and correspondence should be addressed to the Editor. Books for review should be sent to Dr. E. O. Fjelstad. Clinical Reports and Society Proceedings should be sent to Dr. J. I. Kurtz. Practical Notes and Current Refractive Topics should be addressed to Dr. R. M. Peckham, Waterbury, Conn.

Annual Subscription Two Dollars in Advance. Single Copies 20c.

Copy of advertisements must be sent to Dr. Jack I. Kurtz by the tenth of the month preceding their appearance. Subscriptions, applications for single copies, communications with reference to advertising or other business, should be addressed to the Business Manager,

DR. JACK I. KURTZ, Room 209 Yeates Building, Minneapolis, Minnesota.

The Journal has no objection to the reprinting by other magazines of any of its articles, provided such reprints are properly credited to the American Journal of Optometry.

ADVANCEMENT OR EFFACEMENT

"As optometrists, I wonder," said a southern practitioner the other day, "if we realize the remarkable not to say revolutionary, changes that are being brought about in the practice of our profession and in the attitude with which the public regards our work. Changes that are being brought about in ocular work today at a pace so swift as to make one dizzy."

We very much doubt it. Old things are passing away so rapidly that the average optometrist is seemingly working against strange and mysterious forces, and it is not at all strange that he wonders just what it is all about. Twenty years from now, after the optometric history now in the making has been made, we will look back upon this time of optometric reconstruction with a great deal of wonder. Also, many we fear, are likely to have no little regret over their failure to correctly visualize these changing trends in a way to enable them to grasp the greatest of opportunities which are now theirs.

A few years ago, the optometrist was a maker and seller of glasses. The equipment of his "shop" far exceeded that of his "dark room," and his chief interest seemed to be with the technical manufacturing problems of his work. Subjective eye testing was the rule of the day, and the staff upon which these so-called optometrists leaned, when called upon to refract.

This old-time variety of optometrist is whipped.

In a large measure the public is today demanding professional care for its vision and this under-current of public opinion is growing and will continue to grow. The days of the non-progressive, old-time optometrist are numbered unless he speedily changes his ways. The public is today looking for professional men to care for its visual needs. Professional men whose chief interest lies, not in what is "sold," but in the service they can render to their patients. Men not equipped with a trial case and a musty test card hung on the walls of a three by ten foot dark room, but men with fully equipped refracting rooms. Men mentally and physically equipped to go into every detail of ocular refractive work and men in whose judgment they can have the utmost confidence.

These are the refractionists of tomorrow, and it behooves the average optometrist of today to wake up to these conditions before it is too late.

Better equipment, both mental and physical, is the order of the day, on a stage all set for a one hundred per cent professional optometry.

C. C. K.

THE AUGUSTINE FUND COMMISSION

To commemorate in a fitting manner optometry's great loss in the recent death of Dr. R. C. Augustine, the A. O. A. has appointed a commission to solicit funds from the optometric practitioners of America.

This memorial fund is to be used in two ways. First, to erect a suitable monument at the final resting place of Dr. Augustine, and second, in establishing an Augustine Memorial Optometric Library. Both causes are worthy and deserve the wholehearted support of organized optometry.

The fund was started several months ago by Dr. L. Topaz, editor of the **Optometric Weekly,** who through his magazine collected about one thousand dollars. This is a splendid start, but it is only a start and the men now in charge of the fund are hopeful to hear from every optometrist. Donations in any amount are acceptable. On page 310 a subscription blank has been printed. Our readers are urged to fill it out and mail it with check to Dr. A. H. Nordland, 111 Loeb Arcade, Minneapolis, Minnesota, Northwest representative of the Augustine Fund Commission. C. C. K.

MAIL ORDER GLASSES

Since the adoption of a resolution by the North Dakota Optometric Association urging their congressmen to foster legislation which in effect would bar from the use of the mails concerns fitting glasses by mail, much space has been devoted to "mail order specs discussion," by the optometric press of the country.

It is unanimously conceded by optometrists and anyone else familiar with the ocular apparatus that the mail order method of eyesight correction is grossly unscientific and the glasses if worn constantly may damage the eyes of the wearer. If our law makers could be made to get the same viewpoint the needed legislation would be speedily passed. No one state can cope successfully with this problem. It is up to the state societies working together, and the American Optometric Association to bring the matter to the attention of the next congress.

The fight against mail order spectacles has met with opposition from some quarters because it is feared by some that the publicity given to the mail order spectacle firms would result in an increased business for them. Whether or not the publicity would benefit them is immaterial. The public welfare is the paramount issue. Everyone realizes the unfairness of permitting ignorant people to be made the prey of the mail order spectacle concerns and organized optometry could gain much favorable recognition and valuable comment in the press if it were to lead in the fight against this evil. A. S. A.

THE REPLACEMENT MARKET

A short time ago the Automobile Chamber of Commerce announced that from now on the automobile industry would have a big job on its hands in giving adequate service to the 18,000,000 motor cars that are now in operation in this country. They stressed the point that there must be enough service stations, and that these stations must be easily accessible and efficiently operated, and that even though the number of motor cars should never reach a greater number than 18,000,000 that it would take a mammoth industry to keep these cars in repairs and to replace those constantly becoming unfit for use.

This is true in every industry and in every line of endeavor, and it is something that optometrists are apt to forget in their eagerness to add new patients to their clientele, and this is especially true in the larger centers where the new patients seem at times to come quite easily.

Most optometrists are not at all dependent upon new patients. They could nicely subsist by carefully continuing to do all of the optometric work needed by their old patients. This being the case, would it not be well to give more attention to, and to devote even more painstaking effort in, the important work of improving the visual comfort of our old patients, thus making these more satisfied and at the same time making these patients bigger boosters for our services,

rather than devoting this time and effort to securing new patients. The older patients, when satisfied, will in the long-run send us the new material with which to increase our practices, and these new patients, referred by our old ones, come to us with a conviction that our work is a work well worth their consideration. Optometrists greatest interest should lie with the patients of years standing, whose constant loyalty has in a great measure made our profession possible.

T. O. B.

BOOK NOTICES

New Books for review should be sent to Dr. E. O. Fjelstad, 209 Yeates Building, Minneapolis, Minnesota. Only Books of such nature as to be of interest to optometrists will be used in this department. Optometric and Ophthalmic publications that have been issued in the past and which are still procurable through their publishers will also be reviewed, from time to time, as space permits.

TEXT-BOOK OF OPHTHALMOLOGY. By **H. Ernst Fuchs.** Translated by Alexander Duane, M.D. 8th Edition, Illus. 455, pp. 997. Phila. J. B. Lippincott Co., 1923.

This book is primarily a text on diseases of the eye and their treatment, although different than the usual text of its kind the optometric refractionist can find much that may be of use in the general routine of examination. The text is divided into six parts: Part I, Anatomy of the Eye; Part II, General Physiology and Pathology of the Eye; Part III, Anomalies of Refraction and Accommodation; Part IV, Sensory and Motor Functions and Derangements, Examination of the Eye; Part V, Diseases of the Eye; Part VI, Operations On the Eye.

Of course, any one section of the book, in itself, would make a good sized book. Fuchs has generalized at times and to some there may be much missing but all in all the volume is one which may well be near at hand for all refractionists. Parts III and IV are the sections of especial interest to the optometrist, giving information on the highlights of the ocular examination including muscular anomalies. Part V is quite lengthy and covers the field of ocular diseases in a manner more or less complete. Symptoms, prognosis and treatments of each disease are given and although as optometrists we do no treating of ocular diseases a careful study of this section would be of aid in bettering our understanding of these. In direct juxtaposition to the different sections of the various chapters throughout the book are many pages of remarks, in fine print, to more forcibly demonstrate a certain point, making the book very serviceable as a work of reference. The Eighth English translation is from the Twelfth German edition.

E. O. F.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

STATE EDITORS

E. B. ALEXANDER, Oklahoma
A. S. ANDERSON, North Dakota
J. F. ANDREAE, Maryland
D. A. KINNEY, Iowa
H. B. KOLLOFSKI, Minnesota
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Reports of Society Proceedings in Iowa should be sent to Dr. D. A. Kinney, Charles City; in Maryland to Dr. J. F. Andreae, Baltimore; in Minnesota to Dr. H. B. Kollofski, St. Paul; in Nebraska to Dr. C. A. Perrigo, Freemont; in North Dakota to Dr. A. S. Anderson, Fessenden, and in Oklahoma to Dr. E. B. Alexander, Duncan.

MINNESOTA STATE ASSOCIATION BULLETIN

By Dr. J. I. Kurtz, Secretary

Post Graduate Course

A one-day post graduate course will be held on Monday, October 5th, at the Nicollet Hotel, Minneapolis. Dr. F. P. Barr will lecture in the morning on "Fusion Training With the Stereo-Campimeter" and in the afternoon he will lecture on "Charting the Visual Fields." The closing of the course will be marked with a stag dinner at Nicollet Hotel. Association members are urged to attend this course. There will be no registration or admission fee charged the members.

A great deal of interest is being manifested throughout the state in the coming post graduate course judging from the number of reservations already received at the secre-

tary's office. Members who contemplate attending this course are urged to send in their reservations early to the secretary, 209 Yeates Building, Minneapolis.

Membership Drive

The membership drive in the state is in full swing. The state has been divided up into 35 zones. Captains have been appointed for each zone.

The campaign started September 10th and is to close on the 25th. The captains are working hard, each trying to enroll the greatest number of members in his zone in order to get one of the prizes offered by the executive committee to the most successful captains. The following counties in the state are already 100% organized, every optometrist already being in the Society—Aitkin, Chisago, Grant, Goodhue, Houston, Kandiyohi, Le Sueur, Meeker, Nobles, Pipestone, Swift, Stevens, Waseca and Yellow Medicine.

MINNESOTA STATE BOARD

The dates of the Minnesota state board examination are October 6th, 7th and 8th, and will be held in the senate chamber of the Old State Capitol, St. Paul, Minn.

W. H. NORDIN, Opt.D.,
Assistant Secretary.

DR. J. FRED ANDREAE STATE EDITOR FOR MARYLAND

At a recent meeting of the executive committee of the Maryland State Association it was decided to join with the states of Minnesota, North Dakota, Nebraska, Iowa and Oklahoma in publishing the American Journal of Optometry. Dr. J. Fred Andreae of Baltimore, secretary of the State Association, has been appointed state editor.

Dr. Andreae was instrumental in the establishing of the Baltimore Free Eye Clinic, which is claimed to be the first permanent optometric free clinic in the country.

DR. E. B. ALEXANDER STATE EDITOR FOR OKLAHOMA

The executive committee of the Oklahoma State Association appointed Dr. E. B. Alexander of Duncan, Oklahoma, as associate editor for that state to the American Journal of Optometry. Dr. Alexander is secretary of the State Association and it is claimed that due to his efficient and faithful work that state is nearly 100% organized for optometry.

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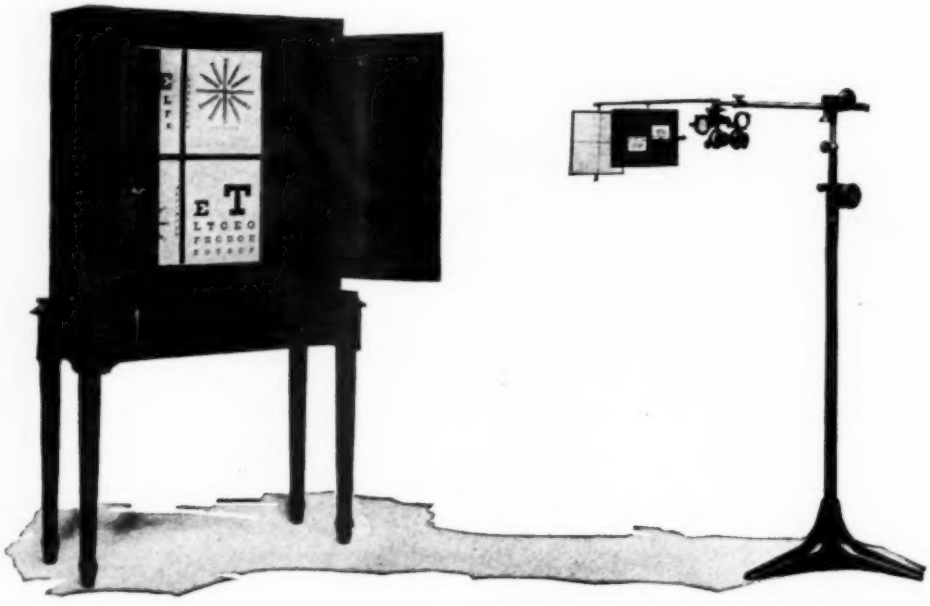

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